

Remarks

Claims 1, 3-8 and 11-14 were pending. Claims 1, 4, 22 and 24 will be amended upon entry of this communication. Claim 3 has been cancelled. Reexamination and reconsideration are requested.

On page 2 of the Office Action, claim 3 was objected to under 37 C.F.R. § 1.75(c). The Examiner's observations are well taken. Accordingly, claim 3 has been cancelled.

Claims 1, 3-8 and 11-21 were rejected under 37 C.F.R. § 112, ¶ 2 as being indefinite. The Examiner made specific reference to the recitation of calcium. To eliminate any confusion, the recitation of calcium has been deleted from the next-to-last paragraph of claim 1.

On page 4 of the Office Action, claims 22-24 were rejected under 35 U.S.C. § 102(b) as being anticipated by Sonoda et al. for the reasons given in the previous Office Action. That Office Action (Paper No. 7), in part, pointed out that "The Sonoda et al. patent [discloses] a bath [that] contains zinc ions in a concentration of 1 to 50 g/l These ranges overlap the ranges recited in claims 1 and 24."

Claim 22 has been amended so that it includes the limitation of "at least 50 g/l of dissolved zinc cations." The Sonoda et al. reference calls for "the acidity of zinc phosphate electrolytic conversion coating solution used in this invention is an aqueous solution in which zinc phosphate is a critical component. The zinc ion concentration is maintained between 1 to 50 g/l, and preferably 5 to 20 g/l." (*See*, col. 2, lines 18-22.) Thus, it can no longer be said that claim 22 is anticipated by Sonoda et al. Claim 23 rises or falls therewith. Claim 24 has been amended so that it no longer defines "an aqueous electrolyte solution which comprises at least 20 g/l of dissolved zinc cations" because the limitation of "at least 50 g/l of dissolved zinc cations" now appears in claim 22.

On page 4 of the Office Action, claims 1, 3-8 and 11-18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Sonoda et al. and further in view of Shimakura et al. and Witte.

The differences between claim 1 and the Sonoda et al. reference were discussed above. Claim 4 now incorporates the limitations of claim 1. Similarly for claims 5-8. Claims 11-18 now depend from and incorporate the limitations of claim 1.

In addition to those differences, Applicants respectfully challenge the *prima facie* assertion of obviousness for the following reasons. First, the cited references fail to anticipate the claimed invention, as discussed above. The Sonoda et al. reference discloses that the zinc ion concentration between 1 to 50 g/l “is a critical component.” In contrast, the claimed invention explicitly voids any overlap with that range of concentration. Thus, as combined, the references would fail to teach the claimed invention, even if properly combinable. Under § 103, the teachings of references can be combined only if there is some suggestion or incentive to do so. (Citations are omitted.) There is no such suggestion or incentive that is disclosed in any of the references which the Examiner proposes to combine. Nor is there any rationale expressed by which a person of ordinary skill in the relevant art would have been motivated to combine the references to arrive at the claimed invention. Additionally, since the Sonoda et al. reference relies upon a zinc ion concentration that is maintained between 1 to 50 g/l, that reference explicitly teaches away from the invention as now claimed. It would therefore discourage the making of the claimed invention, thereby undermining *prima facie* obviousness.

All formal and substantive requirements of patentability are now believed to be met. A Notice of Allowance is therefore solicited.

A check in the amount of \$110.00 is enclosed to cover the one-month extension fee. Please charge any additional fees or credit any overpayments as a result of the filing of this paper to our Deposit Account No. 02-3978 -- a duplicate of the first page of this paper is enclosed for that purpose.

Respectfully submitted,

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Attachment

VERSION WITH MARKINGS TO SHOW CHANGES MADE**In The Claims:**

Please amend claims 1, 4, 22 and 24 as shown below:

1. (Thrice Amended) A process for forming a lubricative film for cold working on a metal substrate, said process comprising the following operations:

(I) bringing said metal substrate into contact with an aqueous electrolyte solution comprising water and:

(A) at least [20] 50 g/l of dissolved zinc cations;

(B) at least 20 g/l of dissolved phosphate anions; and

(C) at least one dissolved auxiliary acid other than phosphoric acid, said auxiliary acid having at least a first ionization constant that is greater than the third ionization constant for phosphoric acid; and, optionally, other constituents as detailed further below,

this aqueous electrolyte also being in contact with a counter-electrode that is not said metal substrate to be cold worked, so that an electric current can pass through the counter-electrode as anode, the aqueous electrolyte solution by ionic conduction, and said metal substrate as cathode;

(II) passing through said metal substrate while it remains in contact with said aqueous electrolyte solution an electric current that has a net cathodizing character at said metal substrate for a sufficient time to form an adherent solid phosphate conversion coating over said metal substrate;

(III) discontinuing contact between said aqueous electrolyte solution and said metal substrate bearing said adherent solid phosphate conversion coating; and

(IV) applying to the exterior surface of said solid phosphate conversion coating, when it is not in contact with said aqueous electrolyte solution, a water- or oil-based lubricant coating,

the aqueous electrolyte solution having a pH value at least as low as the pH value of a hypothetical reference electrolyte solution that contains the same actual amounts of dissolved zinc and phosphate ions as does said aqueous electrolyte solution and in addition contains at least 30 g/l of nitric acid as its only auxiliary acid;

at least one type of divalent or trivalent metal ions selected from a group consisting of magnesium, aluminum, [calcium,] manganese, chromium, iron, nickel, and copper; and

a concentration of calcium ions such that the molar ratio of calcium ions to zinc ions is from 0.1:1 to 2:1.

4. (Amended) The process according to claim [3] 1, wherein said aqueous electrolyte solution comprises a concentration of calcium ions such that the molar ratio of calcium ions to zinc ions is from 0.1:1 to 2:1.

22. (Amended) A process for forming a lubricative film for cold working on a metal substrate, the process comprising the following operations:

- (I) bringing the metal substrate into contact with an aqueous electrolyte solution comprising water and;
 - (A) at least 50 g/l of dissolved zinc cations;
 - (B) dissolved phosphate anions; and
 - (C) at least one dissolved auxiliary acid other than phosphoric acid, the auxiliary acid being present in an amount of at least 30 g/l and having at least a first ionization constant that is greater than the third ionization constant for phosphoric acid; and, optionally, other constituents as detailed further below,this aqueous electrolyte also being in contact with a counter-electrode that is not the metal substrate to be cold worked, so that an electric current can pass through the counter-electrode as anode, the aqueous electrolyte solution by ionic conduction, and the metal substrate as cathode;
- (II) passing through the metal substrate while it remains in contact with the aqueous electrolyte solution an electric current that has a net cathodizing character at the metal substrate for a sufficient time to form an adherent solid phosphate conversion coating over the metal substrate;
- (III) discontinuing contact between the aqueous electrolyte solution and the metal substrate bearing the adherent solid phosphate conversion coating; and
- (IV) applying to the exterior surface of the solid phosphate conversion coating, when it is not in contact with the aqueous electrolyte solution, a water- or oil-based lubricant coating.

24. (Amended) A process according to claim 23 wherein the aqueous electrolyte solution in operation (I) comprises [at least 20 g/l of dissolved zinc cations and] at least 20 g/l of dissolved phosphate anions.